

WHAT IS CLAIMED IS:

1. A linear motor comprising:

first magnets arrayed such that polarization
directions thereof are periodically opposite, second
5 magnets arrayed adjacent to said first magnets such
that polarization directions thereof are periodically
opposite, and an electromagnetic coil opposing said
first and second magnets to generate the Lorentz force
by at least said first and second magnets,

10 said second magnets being disposed such that the
polarization directions thereof intersect those of said
first magnets.

2. The linear motor according to claim 1, wherein
the polarization directions of said second magnets
15 intersect those of the first magnets at an angle of
substantially 90°.

3. The linear motor according to claim 1, wherein
said first and second magnets are rectangular
parallelepiped permanent magnets.

20 4. The linear motor according to claim 1, wherein
said electromagnetic coil comprises at least two
electromagnetic coils disposed to oppose said first and
second magnets and to be energized simultaneously.

5. The linear motor according to claim 1, wherein
25 said first and second magnets are permanent magnets
with the same shape.

6. The permanent magnet according to claim 1,

wherein either one of said first and second magnets which is disposed at a terminal end has a volume smaller than those of other magnets.

7. The linear motor according to claim 1, wherein
5 said first and second magnets generate a sine wave magnetic field.

8. A stage apparatus comprising:

10 a linear motor including first magnets arrayed such that polarization directions thereof are periodically opposite, second magnets arrayed adjacent to said first magnets such that polarization directions thereof are periodically opposite, and an
15 electromagnetic coil opposing said first and second magnets to generate the Lorentz force by at least said first and second magnets, said second magnets being disposed such that the polarization directions thereof intersect those of said first magnets; and

a stage driven by said linear motor,

20 said electromagnetic coil being energized to move said electromagnetic coil and said first and second magnets relative to each other, thereby driving said stage.

9. An exposure apparatus comprising:

25 a linear motor including first magnets arrayed such that polarization directions thereof are periodically opposite, second magnets arrayed adjacent to said first magnets such that polarization directions

thereof are periodically opposite, and an
electromagnetic coil opposing said first and second
magnets to generate the Lorentz force by at least said
first and second magnets, said second magnets being
5 disposed such that the polarization directions thereof
intersect those of said first magnets; and

a stage driven by said linear motor,

said electromagnetic coil being energized to move
said electromagnetic coil and said first and second
10 magnets relative to each other, thereby positioning
either one or both of a substrate and a master with a
stage apparatus comprising a linear motor.

~~10. A device manufacturing method, comprising;~~

positioning at least one of a substrate and a
15 master on an exposure apparatus by controlling a stage
apparatus comprising a linear motor including first
magnets arrayed such that polarization directions
thereof are periodically opposite, second magnets
arrayed adjacent to the first magnets such that
20 polarization directions thereof are periodically
opposite, and an electromagnetic coil opposing the
first and second magnets to generate the Lorentz force
by at least the first and second magnets, the second
magnets being disposed such that the polarization
25 directions thereof intersect those of the first magnets,
and a stage driven by the linear motor, the stage
apparatus being adapted to drive the stage by

energizing the electromagnetic coil to move the
electromagnetic coil and the first and second magnets
relative to each other; and

transferring a pattern of said master onto said
5 substrate.

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